

AMENDMENT UNDER 37 CFR § 1.116
Appln. No. 09/993,621

REMARKS

The present invention relates to a production method of a dehydration reaction product.

In the final Office Action of April 7, 2004, it is appreciated that the Examiner concluded that claims 1, 3, 4, 18, and 19 are allowed. However, claims 5 - 16 were rejected under 35 U.S.C. § 103(a) based on US Patent 6,265,495 (Hirata et al '495). To try to resolve this sole remaining issue, an Interview was scheduled and was conducted on July 8, 2004, by the above-identified Examiner and the undersigned attorney, for which Applicants express their appreciation to the Examiner. The substance of the Interview was indicated on the Interview Summary (Form PTOL-413) prepared by the Examiner, which was attached as a single page attachment to a date cover page (Form PTO-90C) mailed 7/12/04.

In view of a consideration of the Office Action and discussion at the Interview, and in order to try to resolve the remaining sole rejection noted above, Applicants have herein amended claims 5, 6, 10, 13, and 14, and have canceled claims 7, 8, 15, and 17. More particularly, recitations from claims 7 and 8 have been incorporated in the amendments of claims 5 and 6, and recitations from claim 15 has been incorporated into claims 10, 13, and 14. Accordingly, it is respectfully submitted that of the rejected claims, remaining claims 5-6 and 9-14 are in condition for allowance based on this Amendment, and should now be allowed together with previously allowed claims 1, 3, 4, 18, and 19, and with all other claims canceled, it is respectfully submitted that this Amendment is appropriate for entry. The patentability of the claims in accordance with this Amendment is further explained below.

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Applicants direct the Examiner's attention to the fact that the characteristics of the presently claimed invention are disclosed in the Example of the present application as shown below:

Characteristic	Example 6	Comparative Example 3
grinding of the weld of the upper tubesheet of condenser and heat exchanger tube	Ground	not ground
Gel	None	found (The pipe inlet was partly blocked with lumps of gel)
related claims	claims 5 and 6	

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Characteristic	Example 12	Comparative Example 7
opening on the side face of feeding pipe	feeding pipe with opening	feeding pipe without opening
bumping in the reaction vessel	did not occur	Occurred
related claims	claim 10	

Characteristic	Example 12	Comparative Example 9
addition of antigelling agent to the inside of the level gauge in the water separator	antigelling agent added	antigelling agent not added
result of the operation of reaction apparatus	no problem	problem due to gelation in the level gauges in the step of distilling off the solvent
related claims	claim 14	

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Further to the foregoing distinguishing characteristics set forth in the above tables, the beneficial characteristics of the present invention are discussed in further detail below.

Claims 5 - 9 (claims 5,6, and 9 remaining)

With respect to the configuration of the condenser and the tubesheet, the Office Action indicated that the Hirata et al '495 reference suggests these aspects of the claimed invention, and that the devices cited specifically in the presently claimed invention may be substituted with devices suitably selected from among various devices well-known to the art.

The condenser is equipped to cool the gas and liquefy it. To cool the gas effectively, a vertical multitubular heat exchanger is used as the condenser in the present invention. For fixing the heat exchanger tube into the tubesheet tightly, welding on both side of the tubesheet or other method is required. Therefore, the multitubular heat exchanger typically has protrusions of the above heat exchanger tubes on the surface of the tubesheet for welding. Furthermore, the cut off of the protrusions, which is welded point of heat exchanger tubes and tubesheet, weakens the adhesion of heat exchanger tubes and tubesheet. Also, these cut off involve laborious work. So such cut off of the protrusion is not done without a specific reason, and the cited references disclose nothing specially with respect to the condenser.

However, the configuration of the condenser and the tubesheet in accordance with the present invention is not well-known to the art, and by using the present inventive configuration,

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mententive areas for the distillate do not occur at the connecting sites, and the formation of gel-like matter at the connecting sites is inhibited, in contrast to the prior art.

Claims 10 - 16 (claims 1-14 and 16 remaining)

The cited Hirata et al '495 reference fails to disclose the feeding pipe between reaction vessel and water separator, which feeding pipe has openings in the gaseous phase section, and the liquid phase section, as set forth in claim 10. A feeding pipe in accordance with the present invention, having openings in the gaseous phase section and in the liquid phase section is not well-known in the art. These openings can suppress changes in the pressure of the liquid phase section of the water separator.

Also, the cited Hirata et al '495 reference fails to disclose a water separator whose diameter in the lower portion is smaller than the diameter of the upper portion, nor that the interface between the dehydrating solvent and byproduct water is controlled so as to be maintained in the lower portion, as set forth in pending claim 13. The water separator having this characteristic can improve the accuracy of detecting the interface between the dehydrating solvent and byproduct water. Therefore, by accurately controlling the amount of the refluxed dehydrating solvent and the amount of byproduct water to be discharged, it is possible to stably maintain the interface between the dehydrating solvent and the byproduct water, whereby it becomes possible to stably carry out the dehydration reaction in the dehydration reaction step.

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Still further, present claim 14 recites that the water separator is provided with a detection device at an interface between the dehydrating solvent and the byproduct water and/or a gas/liquid interface, and an antigelling agent being caused to act on the inside of the detection device. A schematic representation of such embodiment of the water separator to be used in the practice of the present invention is disclosed in Fig. 10. The cited Hirata et al '495 reference fails to disclose the water separator of present claim 14. By causing the antigelling agent to act on the inside of the detection device, it becomes possible to fully prevent the detection device from being blocked inside by gel-like matter, and thereby fully prevents various chemical products from being deteriorated in the performance characteristics or quality thereof.

In addition to the above, Applicants direct the Examiner's attention to the fact that the cited references disclose nothing specially with respect to the water separator. The structure of water separator of the present invention, whose diameter of the lower portion is smaller than the diameter of the upper portion, is very unique and different from that of the cited references. The difference of the structure of the water separators is known by the comparison of the figure of water separator shown in Fig. 4 of the present invention and FIG. 1 of the cited Hirata et al '495 reference. Because of the unique structure, the construction of water separator of the present invention requires more cost and time than that of ordinary water separator. Therefore, the water separator of the present invention is not used in ordinary reaction apparatus without any specific reason.

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That is, the present invention is achieved, *inter alia*, by conferring special characteristics on the feeding pipe between the reaction vessel and the water separator, whereby the water separator and detection device achieve the above-mentioned superior results and unexpected advantages as compared to the prior art.

Therefore, the feeding pipe between the reaction vessel and the water separator, the water separator, and the detection device are not well-known in the art.

In view of the above, reconsideration and allowance of remaining claims 1, 3-6, 9-14, and 16-19 upon entry of this Amendment in this application are now believed to be in order, and such actions are hereby solicited.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the local Washington, D.C. telephone number listed below.

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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.


Respectfully submitted,

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CERTIFICATION OF FACSIMILE TRANSMISSION

Sir:

I hereby certify that the above identified correspondence is being facsimile transmitted for filing in the Patent and Trademark Office on August 5, 2004 at the USPTO's facsimile filing no. 703-872-9306.

Respectfully submitted,


Joseph J. Ruch, Jr.